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interested in its welfare. Ernest Lowe, of the Plymouth Museum, describes 'The Registration and Numeration of Museum Specimens' as practiced in that institution and the editor invites other papers on that subject. 'An Outsider's View of Museums and the Public' suggests that the latter does not appreciate the instruction to be found in museums. The balance of the number is filled with notes regarding British and foreign museums.

The Plant World for March contains the fourth instalment of 'Notes from the Note Book of a Naturalist in Guam,' by William E. Safford; 'Another Use for the Royal Palm,' by William Palmer; 'Spontaneous Fission of Olive Trees in Palestine,' by Charles A. White, and 'Botanizing in a Cactus Bed,' by Charles F. Saunders.

IN the *Proceedings of the American Academy of Arts and Sciences* W. E. Castle gives a very clear exposition of the main features of 'Mendel's Law of Heredity,' accompanied by illustrations of its workings. It is only to be regretted that this useful paper is not published where it would be more generally accessible to the many who wish to know just what Mendel's law is, but do not care to spend the time to look up articles relating to it.

NUMBER 9 of Volume V. of the *Memoirs of the Boston Society of Natural History* is devoted to a detailed description of 'The Skeletal System of *Necturus maculatus*,' by Harris H. Wilder. This is accompanied by several plates which admirably illustrate the features of the skeleton. The author hopes that as occasion offers he may add to this papers on other systems of *Necturus* and thus give a complete monograph of a typical tailed amphibian.

SOCIETIES AND ACADEMIES.

AMERICAN PHYSICAL SOCIETY.

THE regular winter meeting of the Physical Society was held at Columbia University, New York city, on February 28, 1903.

In a paper on the 'Nucleation of the Atmosphere During Cold Weather,' by Carl Barus,

the author presented the results of recent work with his coronal methods of counting the number of condensation nuclei in the air. These nuclei were found to be present in abnormally large numbers during the very cold weather of December and January. Curves were exhibited showing a remarkable parallelism between fall of temperature and rise of nucleation. Three alternative hypotheses were mentioned by Professor Barus in explanation of the results, viz., a current from the upper air rich in nuclei may be brought down by the cold wave; or the formation of water nuclei may bring down an air stratum overlying cities; or the water nuclei may be radioactive at low temperatures and thus produce other nuclei by ionization. Experiments are in progress to test the latter hypothesis.

A second paper by the same author dealt with the 'Ionization and Nucleation of the Phosphorous Emanation.' The results show that while the ionization produced vanishes very quickly, the coronas due to condensation on the nuclei present last for a relatively long period. In this case, therefore, there appears to be no relation between ionization and nucleation.

Professor Barus also described an interesting and simple 'Method of Determining the Ratio of the Velocities of the Ions in Air,' depending on the rate of dissipation of charge from a point. The value obtained for the ratio of the velocity of the negative ion to that of the positive ion was 1.32, which agrees closely with the values obtained by other methods.

A paper on 'Diffusion and Supersaturation,' by H. W. Morse and G. W. Pierce, described quantitative experiments based upon an experiment originally due to Liesegang. When the end of a capillary tube containing a solution of potassium chromate is dipped into a water solution of silver nitrate, the silver nitrate diffuses up into the tube and throws down a precipitate of silver chromate. The silver chromate, instead of growing continuously as diffusion proceeds, forms in distinct layers widely separated in comparison with the thickness of the layers. Measurements were made of the distances between these layers and the time was observed at which each suc-

cessive layer was formed. The results obtained agreed in a very satisfactory manner with the theory of diffusion and made it possible to determine the value of the 'metastable solubility product.' The value found indicated that at the limit of supersaturation the solution contained 145 times as much silver chromate as is required to form a precipitate in the presence of the solid phase.

A paper on the 'Rôle of Thermo-Electromotive Forces in a Voltaic Cell' was presented by H. S. Carhart. The writer considered briefly the theory of a voltaic cell, so far as relates to the properties dependent on temperature, and showed that all these could be completely explained by means of electrolytic thermoelectromotive forces between a metal and the liquid in contact with it. Numerous experiments were described whose results were in agreement with the theory.

In a paper entitled 'A Simple Geometrical Principle and its Possible Relation to a General Physical Theory,' Major J. Millis gave an account of the possible modes by which a number of equal spheres may be grouped. It was shown that the grouping that is symmetrical and capable of indefinite extension by the addition of more spheres is not the arrangement that gives a minimum total volume. The possible bearing of this fact upon molecular theories was suggested.

Dr. J. R. Benton described a 'Method of Determining Internal Resistance, Applicable to Rapid Polarizing Cells.' The method is a modification of that of Beetz and gives more accurate results. It also has the advantage that it can be used for cells of small electromotive force and resistance.

The next meeting of the Physical Society will be held on April 25.

ERNEST MERRITT,
Secretary.

NEBRASKA ACADEMY OF SCIENCE.

THE thirteenth annual meeting of the Nebraska Academy of Science was held in Lincoln, Nebr., January 22 and 23, 1903. President Charles Fordyce, Dean of Nebraska Wesleyan University, presided.

The following papers were read:

'The Causes of Metamorphosis in *Amblystoma tigrinum*,' Dr. J. H. Powers. The metamorphosis of *Amblystoma tigrinum* is not, as has been generally assumed, due to enforced aerial respiration; neither is it affected within wide limits by variations in light or heat stimulus. The active causes are variations in metabolism due to fluctuations in food supply. Sudden checks in food supply lead to immediate metamorphosis, slow and constant food supply postpone metamorphosis and prolong growth in larval stage.

'Sand and Gravel Industry in Nebraska,' Dr. G. E. Condra.

'Summary of Study of fifty-seven Cases of Phenomenal Chest Expansion in Nebraska Schools,' Dr. W. W. Hastings.

'The Diagnosis of Human Parasites,' Dr. H. B. Ward. In this paper Dr. Ward dealt especially with the necessity of more accurate knowledge concerning the eggs of parasites, and concerning the other evidence upon which differential diagnoses might be made.

'Absorption of Starlight by our Atmosphere,' Professor G. D. Sweezy.

'Wave Erosion on the Western Shore of Lake Huron,' Dr. C. H. Gordon.

'A Final Report of the Washings of the Missouri River,' Professor H. B. Duncanson. Professor Duncanson showed the regularity of the shifting of the bed of the Missouri River, and the laws governing the constant gradual backward and forward movement of the channel in the river valley.

'An Old Channel of the Platte,' Dr. G. E. Condra. Dr. Condra, by means of maps and sketches, showed clearly the nature of the broad valley passing from northwest to southeast north of Wahoo, Nebr., which seems clearly to have been a former Platte channel.

'Common Sense and Computation,' Dr. E. W. Davis. A paper devoted to showing errors resulting from continued use of too many decimals in computation.

'On The Paramorphic Development of Hornblende from Augite,' Dr. C. H. Gordon (read by title).

'On the Pyroxenites of the Greenville

Series of Ottawa County, Canada,' Dr. C. H. Gordon (read by title).

'Notes and Descriptions of North American Bees,' Mr. J. C. Crawford, Jr. (read in abstract).

'Florence Flint; Its Production and Uses,' Dr. G. E. Condra. A recently discovered building stone found in southern Nebraska.

'Notes and Descriptions Leading to a Monograph of the Telamonini,' Mr. W. Dwight Pierce (read by title).

'A New Species of *Japyx* from Nebraska, with a Synopsis of North American Species,' Mr. Myron H. Swenk (read in abstract).

'Conditions Serving to Influence the Fauna of Nebraska,' Dr. R. H. Wolcott. The author showed in a general way the geographic, topographic and climatic conditions which tend to produce within the limits of the state a very extensive fauna, and showed the presence of components derived from quite unlike faunal regions.

'Conditions Affecting the Distribution of Forest Trees in Nebraska,' Professor C. E. Bessey. A statement of the conditions which have limited the development of forests in Nebraska in the past, evidences showing the existence of suitable conditions for the future spread of forests in the state, and an examination of the conditions which affect, favorably or unfavorably, this development.

'Madstones,' Professor H. B. Duncanson. Reference to popular theories held in some portions of the state.

'The Development and Distribution of the Human Warble Fly,' Dr. H. B. Ward (illustrated by lantern). An account of several specimens recently secured from Central America.

'A Method for the Study of Peripheral Nerves,' Mr. W. A. Willard (illustrated).

'On the Development of the Pineal Eye of Lizards,' Mr. Willard (illustrated).

Many important items of business were transacted, the most important being measures taken to insure the regular appearance in the future of the *Proceedings* of the society and the limiting of its scope to articles strictly the results of original investigation.

The following officers were elected:

President—Professor Lawrence Bruner, University of Nebraska.

Vice-President—Mr. Wm. Cleburne, Omaha, Nebr.

Secretary—Dr. Robert H. Wolcott, University of Nebraska.

Treasurer—Mr. Geo. A. Loveland, United States Weather Service, Lincoln, Nebr.

Board of Directors—Mr. Charles Lobingier, Omaha, Nebr.; Dr. A. S. Von Mansfelde, Ashland, Nebr.; Professor H. B. Duncanson, State Normal, Peru, Nebr.

Somewhat over forty members and many visitors were in attendance and the meeting resulted most successfully.

ROBERT H. WOLCOTT,
Secretary.

NEW YORK ACADEMY OF SCIENCES. SECTION OF ANTHROPOLOGY AND PSYCHOLOGY.

THE regular meeting of the section was held March 23, Professor Thorndike presiding. The first paper was presented by Dr. Clark Wissler, 'Observations on Abnormalities of the Hard Palate.' The paper reported progress in the measurements of the casts of the hard palates of idiots. The first thing to be considered in this work was the determination of the significant points and dimensions in the palate. The results presented indicated important structural relations between the width at the canine teeth and the length of the palate measured from the first molars and the maximum height of the arch. The comparative study of the palates of normal and of idiotic persons will be based upon these measurements.

Dr. A. Hrdlicka then read a paper, 'Physical Anthropology of the Hyde Expedition in 1902.' During 1902 Dr. Hrdlicka made two expeditions, one of seven and the other of three months' duration, to the southwestern United States and Mexico. These expeditions were the conclusive ones of a series of five, begun in 1898, made for the purpose of ascertaining the physical characteristics of all those present as well as extinct tribes which occupy or occupied the region marked by the boundaries of the ancient Pueblos, Cliff-

Dwellers and Nahuatl (Toltec, Chichimec, Aztec) peoples. The region thus bounded extends uninterruptedly from Utah and Colorado to the Mexican states of Morelos and Guerrero, and in it live at present a little over forty tribes or distinct groups of Indians. About nine tenths of all these peoples were visited on the five expeditions and examined; all the measurements and data secured are being studied, but to arrive at detailed results will require several years.

What can now be safely stated is: (1) All the ancient as well as the modern peoples in the region mentioned belong to three physical types, and these types are identical with those widely represented in all directions outside of this region; and (2) a very large majority of the present peoples examined are physically identical with the prehistoric inhabitants of these same districts (so far as could be ascertained from the osteological material recovered); the prehistoric remains (osteological) show no type that is not represented somewhere in the region covered to-day, and there is no type among the living tribes not represented among the ancient ones.

The visit of so large a number of tribes, as well as the search for skeletal remnants of the extinct peoples, afforded a very good opportunity for general ethnological and archaeological observations, the substance of which can be stated as follows: The Mexican Indians visited, with the exception of the Huichols and Tarahumares, are in their mode of life and habits far more like the whites about them than is the case with our Indians of the southwest; nevertheless, the Mexican tribes preserve much that would be of value to the ethnologist. Dr. Hrdlicka's exploration in northern Jalisco and in Zacatecas resulted in the discovery of the ruins of eleven good-sized pueblos or towns, the excavations at one of which showed that its inhabitants had reached a comparatively high grade of culture. The pueblo and cliff ruins of our southwest may be compared to a head which connects by a long narrow neck running through Cora Grande in Arizona, Coras Grande in Mexico, Zape in Mexico and La Quemada in Zacatecas, with a large body of ruins which begin in

southern Zacatecas and Jalisco and extend through all the southern part of Mexico to Guatemala and Central America. La Quemada was found to be above all a fort, in all probability the most representative stone-built native fort in North America.

In Zacatecas Dr. Hrdlicka discovered a colony of Tlascaltecs, transplanted hither by the Spaniards in the seventeenth and eighteenth centuries; and further south he found two villages still occupied by the remnants of the ancient Chichimecs of Teul. South of Juchipilla, in Zacatecas, is located a perfect cliff-dwelling, probably the most southern one in existence. This particular ruin, known under the name of 'Las Ventanas' (the windows), has been visited by at least one American before, namely, by Miss Britton.

JAMES E. LOUGH,
Secretary.

NEW YORK ACADEMY OF SCIENCES. SECTION OF
ASTRONOMY, PHYSICS AND CHEMISTRY.

At the meeting of the section on March 2; Professor Wm. Hallock read a paper on the 'Measurement of the Altitude of Mount Whitney, California, by Boiling-point Determinations.'

At the time of the ascent of Mount Whitney last summer by the party under Mr. Harrington Putnam, apparatus was taken to the top, and a determination of the boiling point was made at ten o'clock on August 23. The observed boiling point was $186^{\circ}.47$. Applying the instrumental corrections and reducing this by the Smithsonian tables, the corresponding barometric pressure was 17.70 inches. The Weather Bureau kindly furnished the barometric pressure, temperature and vapor tension for Independence, California, for that morning. They were: barometric pressure, 25.93 inches; temperature, $78^{\circ}.0$, vapor tension, 0.110 feet. Substituting these values in the formula given by Bigelow on page 490 of the second volume of the annual report of the 'Chief of the Weather Bureau' for 1898-99, a difference in altitude between Independence and Mount Whitney of 10,633 feet results. Inasmuch as this determination was made five feet below

the actual summit of the mountain, and Independence is 3,910 feet above sea-level, it would give a final value for the elevation of Mount Whitney of 14,548 feet. It may be stated in this connection that the value which was obtained by Secretary Langley as a result of a very complete series of determinations was 14,522 feet. Of course, this coincidence is accidental, as the probable error in either case is undoubtedly not less than ten or fifteen feet. One object of this determination was to show the availability of boiling-point apparatus, which is light and convenient for such determinations, as being very much more reliable than the aneroid barometer, and much easier for transportation than the mercurial barometer.

A second paper was read by Dr. S. A. Mitchell, on 'The Discovery of New Gases in the Sun,' in course of which it was shown that the interdependence of the sciences is nowhere better illustrated than in spectroscopic work, when astronomy, the most ancient of all the sciences, goes hand in hand with physics to find a new chemical element. In recent years, through spectroscopic researches, several metals have been added to the list of elements. In April, 1895, by investigations on a specimen of cleveite, Ramsay announced the discovery of terrestrial helium which gives a line in its spectrum agreeing with the D_3 line, familiar for more than twenty-five years in stellar, prominence and chromospheric spectra. About the same time, Rayleigh and Ramsay announced the discovery of another new element which was called argon. In the early summer of 1898, Ramsay found two more gaseous elements, neon and krypton, and subsequently a heavier gas to which the name xenon was applied. These five new elements, helium, neon, argon, krypton and xenon are found in atmospheric air, and can be obtained from air by fractional distillation by making use of the extremely low temperatures of liquid air and liquid hydrogen. Atomic weights have been assigned as follows: helium, 4; neon, 20; argon, 40; krypton, 82, and xenon, 128; and the gases seem to form a series in the periodic

table of elements between the fluorine and sodium groups.

Investigations carried out on photographs of the 'flash' spectrum at the Sumatra eclipse of 1901 enabled Dr. Mitchell to find that the remarkable variations in the intensities of the lines of the ordinary solar spectrum and of the 'flash' spectrum (for one does not *look* to be the reversal of the other) are due to the different *heights* to which the vapors of the various metals ascend above the sun's surface. As a consequence, although helium lines are not found in the ordinary solar spectrum, the helium lines in the spectrum of the chromosphere are very bright, indeed.

In view of the similarity of the new gases, neon, argon, etc., to helium, and as the helium lines are such prominent ones in eclipse spectra, it was expected that the new atmospheric gases—at least the lighter ones, neon and argon—might appear in the sun's atmosphere. A detailed comparison of the lines of the flash spectrum measured by Dr. Mitchell with those of the new gases lately published has led to the discovery that neon and argon are both present in the chromosphere, while it is doubtful whether krypton and xenon are there or not.

S. A. MITCHELL,
Secretary of Section.

COLUMBIA UNIVERSITY GEOLOGICAL JOURNAL CLUB.

March 6.—Dr. Julien showed some very large chlorite pseudomorphs after garnet from the Spurr mine, Marquette, Mich., a single crystal measuring almost four inches in diameter. Professor Grabau reviewed Dr. A. E. Ortmann's paper on 'The Geographical Distribution of Fresh-water Decapods and its Bearing upon Ancient Geography.'

March 13.—Dr. A. F. Rogers discussed crystal habit and methods of expressing it. Dr. Julien reviewed a paper by M. J. Fuller in the *Journal of Geology* (November-December, 1902) on the etching of quartz in the interior of conglomerates. Professor Grabau reviewed from the *American Journal of Science* (August, 1902) a paper by W. M. Davis on the terraces of Westfield River of Massachusetts.

March 20.—The following papers were reviewed: Charles Schuchert, 'On the Manlius

Formation of New York' (*American Geologist*, March, 1903); B. E. Livingston, 'The Distribution of the Plant Societies of Kent County, Mich. (Mich. Surv., 1901), by Professor Grabau. Stuart Weller, 'The Composition, Origin and Relationships of the Corniferous Fauna in the Appalachian Province of North America' (*Journal of Geology*, May-June, 1902); G. F. Matthew, 'Notes on Cambrian Faunas' (*Trans. Roy. Soc. Can.*, 1902-03), by Miss Florence Henry.

H. W. SHIMER.

NEW YORK SOCIETY OF BIOLOGY TEACHERS.

THE third meeting of the academic year was held Friday, January 30, 1903, at 8:15 P.M.

The topic for the evening's discussion was 'The Public Scientific Institutions and the School System.' Dr. H. C. Bumpus, of the American Museum of Natural History, opened the discussion. He said, in part, that certain of the collections had been directly planned with a view to helping teachers and students, that rooms and a working library had been set apart for their use, and that sets of guide leaflets had been issued for the express purpose of making the collections more directly available to the teaching public. He then indicated how certain exhibits might be arranged to cover a number of special subjects, and especially to bring the museum into use as a factor of public instruction in matters of current interest.

Dr. N. L. Britton then explained in detail to what extent the New York Botanical Gardens were available to teachers and students. Especially with reference to the trips under guidance of a detailed official, the permanent microscopic exhibit, the arboretum, the museum and public lectures, the garden was of practical assistance to the teacher. It was hoped later to furnish some plant material free to the board of education.

Dr. C. H. Townsend called attention to the fact that the New York Aquarium was already cooperating with the high schools of the city to the extent of setting aside material and balanced salt-water aquaria for them, and in closing the aquarium to the

public for two days in the week to allow classes from the schools to work in quiet. He furthermore offered to supply the schools with invertebrate material as needed in co-operation with the board of education.

Dr. A. G. Mayer pointed out some practical examples of what was being done by the Brooklyn Institute of Arts and Sciences for the schools, and gave his ideals of a children's museum which should be incorporated in the museum.

After the regular program a general discussion followed, with this practical result: A committee was appointed by the president of the association to endeavor to obtain, so far as possible, the fullest cooperation between the public scientific institutions and the city schools.

The following officers were elected to hold office for 1903:

President—H. A. Kelly, Ethical Culture School.

Vice-President—Miss K. B. Hixon, Morris High School.

Secretary—G. W. Hunter, Jr., DeWitt Clinton High School.

Treasurer—Miss I. M. Clennedin, Girls' High School, Brooklyn.

G. W. HUNTER, JR.,
Secretary.

DISCUSSION AND CORRESPONDENCE.

THE TYPES OF LINNÆAN GENERA.

THE interesting note of Mr. O. F. Cook, on the 'Types of Pre-Linnæan Genera' (*SCIENCE*, February 27, 1903, p. 350), touches the most important question still unsettled in the nomenclature of animals and plants. We have yet to agree on a means of fixing the type for the genera of the earlier writers, our conception of a genus being necessarily that of a cluster of species grouped around the type species of a genus. The fixation of type by elimination is an utter failure, as Mr. Cook has pointed out. It is impossible to define this process so as to bring out the same result in different hands and in different groups.

We have already recognized that the selection of names must not in any degree be left to individual choice. We must agree that the choice of the type of the genus must be made